WP2: Framework conditions

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Flexible Nordic Energy Systems

DTU

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WP2: Framework conditions

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WP2 Objectives

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Why are the potentials not used?

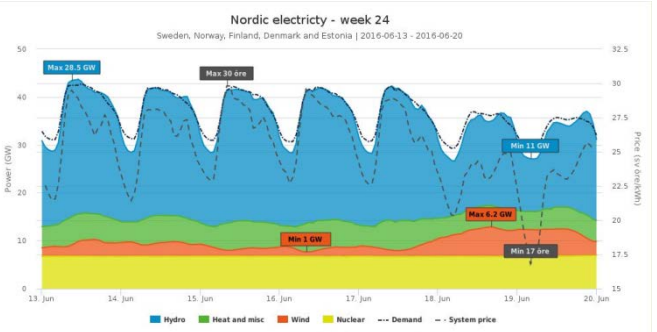
a) **Identify regulatory and technological barriers/drivers** within different sectors
   1) Heating
   2) Electricity (and transmission)
   3) Transportation
   4) Gas

b) **Develop coherent regulatory frameworks and market designs** that facilitate energy market couplings that are optimal for the Nordic conditions in an EU context.

Key findings - so far

- Differences in tax and tariff structures
  - Electricity taxed on the consumption side
    - no taxes on fuels for in order to increase competition
  - Other sectors taxed on the fuel use
    + tax exemption for biomass use
  - Different levels in the different countries

- The Nordic power market is well functioning despite a few technical challenges.
  - Designed to balance variations in demand (load profiles) and hydro power - ***energy flexibility***
  - More VRE require - ***power flexibility***



District heating – key findings:

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Flexible resources – esp. with heat storage

- CHP - act to high power prices
- P2H - act to low power prices

No direct policies for flexibility in the DH system

- Mainly provided by market incentives

Investment and re-investment in CHP and P2H impeded by lack of incentives

- Operational income (not enough price variation), investment subsidies and operation subsidies

District heating – key barriers:

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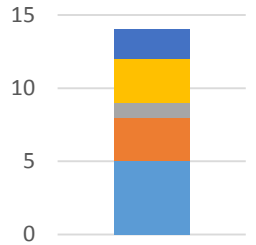
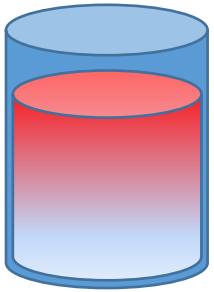
- CHP: Baltics: Lack of exposure to electricity markets
- P2H: Electricity taxes and tariffs increase cost of electricity consumption
  - Poor competitiveness of P2H against other heat-sources, e.g. biomass boilers



- General resources: Operational practice of heat production following heat demand
  - Load-following by heat production units rather than utilisation of heat storage is a barrier for flexible operation



Key results from the electricity survey

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Drivers for flexibility…

- ✓Equal & open access to the power markets
- ✓Supportive policy including low risk for TSO and DSO investment in domestic and transnational grid capacity
- ✓Supportive policy for demand-side activation. E.g. smart grids

Price signal is lacking to activate flexibility potentials

- Low price level cause no incentives to invest in flexible capacity
- Not sufficient incentives for the consumption side to act flexible + high tariffs
- Lack of market based RES support scheme

Next steps

✓ District heating

(√) Electricity

- Transport sector
- Gas

Links to the other wp's

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WP1: Flexibility need and potentials

Task 1.1 Review and Method development

Task 1.2 Flexibility potential cost curves, Technology catalogue

Task 1.3 Flexibility need, uncertainty and impact on reserve need

WP2: Framework conditions

Task 2.1 Review of existing framework conditions

Task 2.2 The Nordic energy system designs

Task 2.3 Market integration, frameworks, and market designs

Task 2.4 Coherent market scenario set-ups

Task 2.5 Pathways to a flexible Nordic energy system

WP3: Energy system analysis of integrating energy systems

Task 3.1 Model update / adaption

Task 3.2 Market coupling analyses

Task 3.3 Analytical results: comparison and interpretation

WP 4: Policy recommendations

Task 4.1 Economic impact of VRE and flexibility

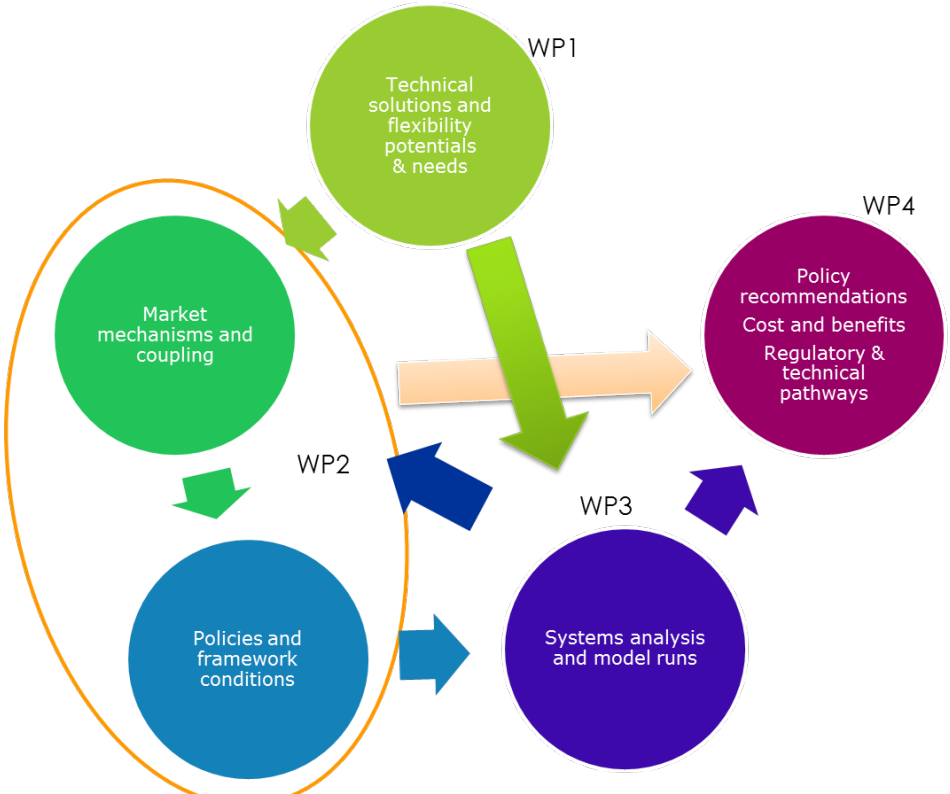
Task 4.2 Creating a sustainable and stable Nordic energy System

WP 5: Dissemination and capacity building

Task 5.1 Website, LinkedIn, and Newsletter

Task 5.2 Advisory board meetings

Task 5.3 Workshops/Seminars



Thank you for your interest

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Questions ?

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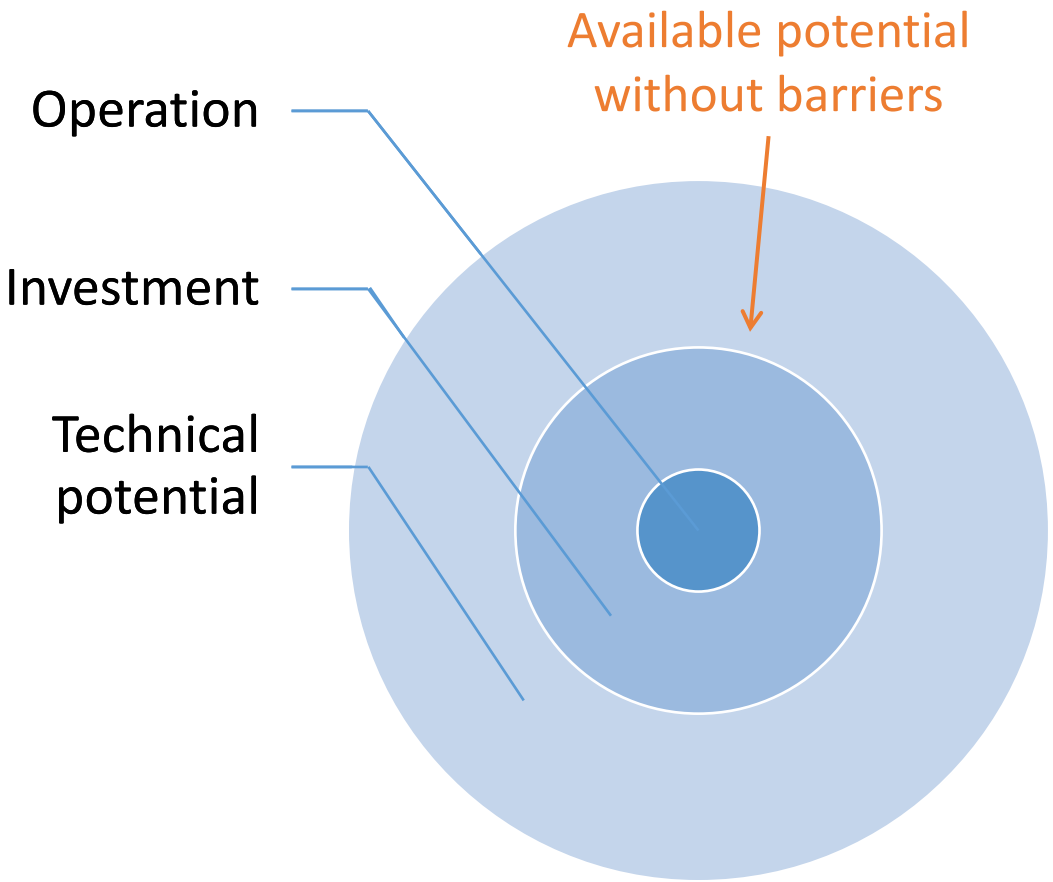
Regulatory barriers and drivers



Framework category: Political/jurisdictional, financial, market control, behavioural/organizational.

Political level: EU, national, local

Effect on flexibility: Driver or barrier for investment and operation.

Incentive: Direct or indirect, strong or weak incentives